Development and Genetic Analysis of a Mapping Population on *Medicago truncatula*

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Key words : *Medicago truncatula* , annual medic , mapping population , genetic analysis

Introduction *Medicago truncatula* (annual medic) has become a model system for legume biology . Comparative genetic mapping studies can reveal similarities and differences in gene content and gene order between genera belonging to different taxa . Germplasm of annual medic was identified and screened for genetic mapping using agronomic characters and SSR markers . Our objective was to construct a mapping population of *Medicago truncatula* and perform genetic analysis on this population .

Materials and methods A total of 26 accessions of annual medic were planted in a randomized block design with three replications at Nanjing , China in spring of 2007 . The sequences of SSRs primer pairs along with the SSR marker name , and linkage group in soybean and *M . truncatula* were identified . Genetic diversity of each SSR locus was expressed by allelic richness and the Simpson genetic diversity index .

Results Germplasm was screened by phenotype and genotype into two extreme polymorphic parental lines that were crossed and then selfed to generate a mapping population for QTL analysis . We obtained 61 polymorphic loci and 886 polymorphic alleles , and a dendrogram was generated with the UPGMA clustering for 26 annual medic by 61 polymorphic markers (Figure 1) . The levels of phenotypic variation among 26 annual medic accessions were similar to genetic diversity in DNA . A total of 39 nuclear microsatellites (nuSSR) and 30 chloroplast microsatellites (cpSSR) were used to screen 26 accessions of annual medic . Line AFD , Caliph and J .51 were selected as parents to obtain the F_1 . The frequency distribution and fitted mixed distribution for 100-pod weight and seed yield of the F2 population are shown in Figure 2 . Genetic mapping and QTL analysis will be conducted with the F2 population . One of the targets was to focus on the seed yield of annual medic .

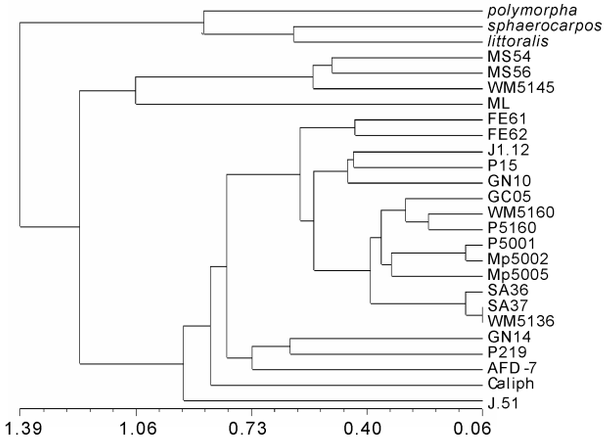

Figure 1 *Cluster Dendrogram of 26 annual medic based on nuSSR and cpSSR .*

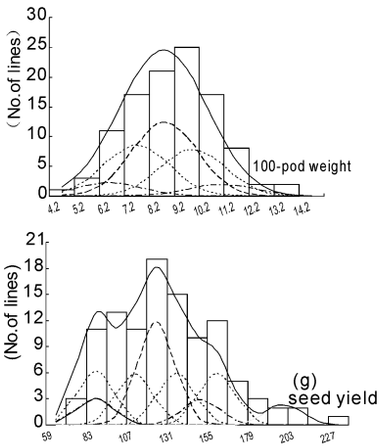

Figure 2 *Frequency distribution and fitted mixed distribution for 100-pod weight and seed yield of the W5160× P5160 population .*

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